X-ray Propagation Simulation

Dave Sagan, Georg Hoffstaetter, Ken Finkelstein

The next generation of x-ray free electron lasers and ERL based sources will be capable of delivering enough radiation to damage the sample in a time scale range between seconds and picoseconds! This creates opportunities for new science, but presents a number of challenges to the experimenter. For example time-resolved x-ray spectroscopy will reveal new information in fields like plasma and condensed matter physics, chemical catalysis, and photo-activated biology, IF the full range of energy of the excitation spectrum can be collected simultaneously. Parallel data collection requires special spectrometers, automated alignment procedures, and multi-element detectors. In this REU project the student will work with two scientists; one who developed the BMAD code used for modeling the combined function of electron optics in the CESR storage ring, and the second who is designing x-ray diffraction based spectrometer optics. This programming project has the goal of incorporating into BMAD the capability to model and optimize the function of these new x-ray devices.